

FIG. 1

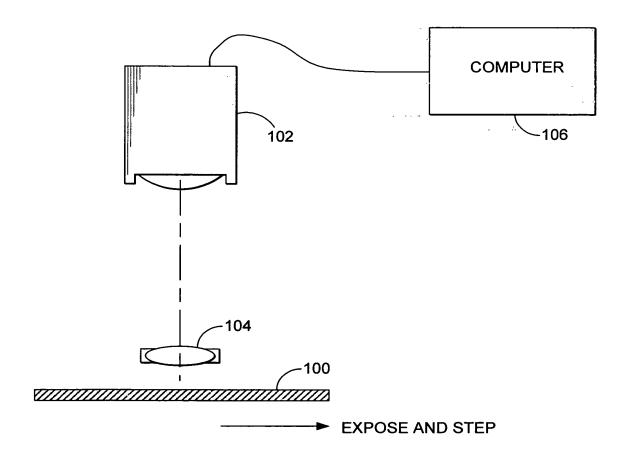


FIG. 4

OBTAIN OR CREATE ORIGINAL FIG. 2 DIGITAL SIGNAL OR IMAGE ESTIMATE ROUGH OFFSET AND RMS NOISE **CHOOSE N OR N-BIT IDENTIFICATION WORD, E.G. 32 GENERATE N-BIT IDENTIFICATION WORD** GENERATE OR SYNTHESIZE N "RANDOM" INDEPENDENT SIGNALS WITH ROUGHLY GAUSSIAN DISTRIBUTION ABOUT SOME MEAN VALUE, WHERE SIGNALS HAVE EQUAL EXTENT AND DIGITAL SPACING OF ORIGINAL DIGITAL SIGNAL OR IMAGE APPLY DIGITAL FILTER WHICH ATTENUATES BOTH LOW AND HIGH FREQUENCIES, LEAVING MIDDLE-RANGE FREQUENCIES LARGELY INTACT CONDENSE N RANDOM SIGNALS TO A LOWEST ACCEPTABLE BIT VALUE IF MEMORY OR STORAGE SPACE IS AT A PREMIUM ADD ALL RANDOM IMAGES TOGETHER WHICH HAVE A CORRESPONDING "1" IN THEIR ASSOCIATED BIT-PLACE-VALUE OF THE N-BIT IDENTIFICATION WORD, CALL THIS THE BASE COMPOSITE SIGNAL OR IMAGE EXPERIMENT VISUALLY WITH GAIN AND GAMMA APPLIED TO BASE COMPOSITE SIGNAL OR IMAGE, ADDING THIS TO ORIGINAL DIGITAL SIGNAL OR IMAGE, AND DETERMINING THE ACCEPTABLE PERCEIVED NOISE LEVEL APPLY FOUND GAIN AND CAMMA TO BASE COMPOSITE, ADD TO ORIGINAL, THEN CALL THIS THE DISTRIBUTABLE SIGNAL OR IMAGE STORE AWAY AND SECURE ORIGINAL SIGNAL OR IMAGE, ALONG WITH N-BIT IDENTIFICATION WORD AND THEN RANDOM SIGNALS

SELL OR DISTRIBUTE THE DISTRIBUTABLE SIGNAL OR IMAGE

OBTAIN DIGITAL OR NON-DIGITAL COPY OF SUSPECT SIGNAL OR IMAGE FIG. 3 DIGITIZE IF NOT ALREADY DIGITAL CUT AND MASK PORTION OF SIGNAL OR IMAGE BELIEVED TO BE SUSPECT (ONLY IF ENTIRE SIGNAL OR IMAGE IS NOT SUSPECT) PROCURE ORIGINAL DIGITAL SIGNAL OR IMAGE AND CUT AND MASK TO ROUGHLY THE SAME LOCATION OR SEQUENCE VISUALLY RESCALE AND REGISTER THE CUT-OUT SUSPECT SIGNAL TO THE CUT-OUT ORIGINAL SIGNAL RUN THROUGH SEARCH PROGRAM WITH MEAN SQUARED ERROR AS CRITERIA AND X OFFSET, Y OFFSET, AND SCALE AS THE THREE VARIABLES APPLY X OFFSET, Y OFFSET, AND SCALE TO CUT-OUT SUSPECT, THEN RESAMPLE ONTO EXACT GRID AND CUT-OUT OF ORIGINAL SIGNAL RUN THROUGH SEARCH PROGRAM WITH MEAN SQUARED ERROR AS CRITERIA AND DC OFFSET, GAIN, AND GAMMA AS THE THREE VARIABLES; APPLY TO SUSPECT SUBTRACT ORIGINAL FROM SUSPECT. GIVING DIFFERENCE SIGNAL OR IMAGE STEP THROUGH ALL N RANDOM INDEPENDENT SIGNALS, MASKED AS ORIGINAL AND CROSS-CORRELATED WITH DIFFERENCE SIGNAL IN IMMEDIATE NEIGHBORHOOD OF REGISTRATION POINTS FIND 0 AND 1 LEVEL BY AVERAGING FIRST FOUR 0101 CODE VALUES ASSIGN EITHER A 0 OR A 1 TO EACH CROSS-CORRELATION RESULT DEPENDING ON PROXIMITY TO THE AVERAGES OF PREVIOUS STEP CHECK RESULT AGAINST SECURED IDENTIFICATION NUMBER PROSECUTE IF IT MATCHES? OR AT LEAST SEND A NASTY LETTER DEMANDING RECOMPENSE

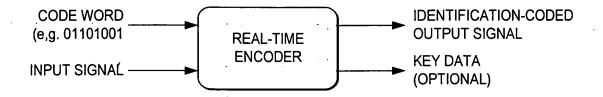


FIG. 5

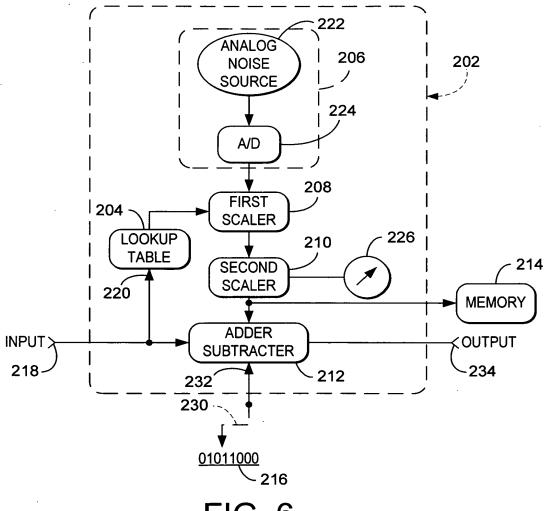
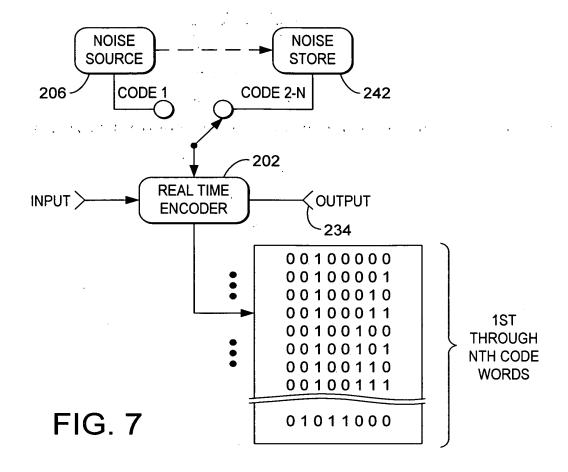


FIG. 6



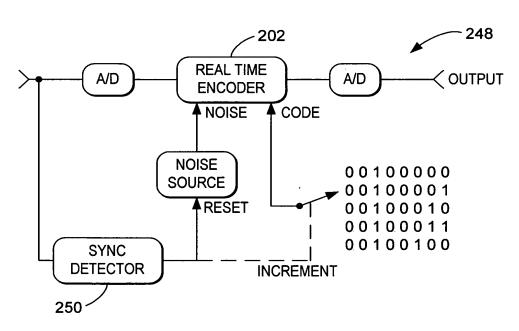
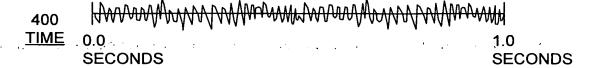
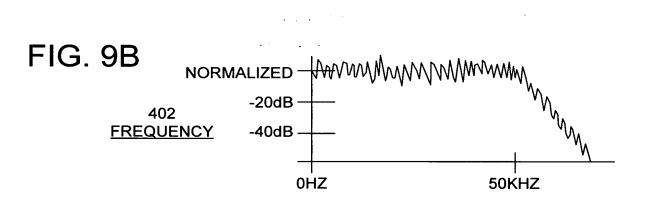


FIG. 8

FIG. 9A





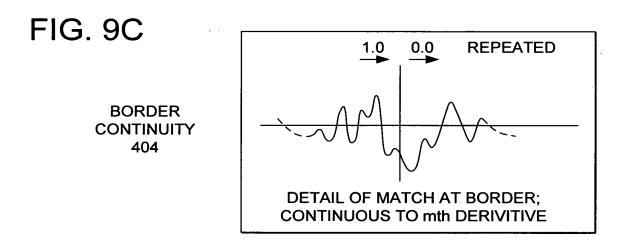
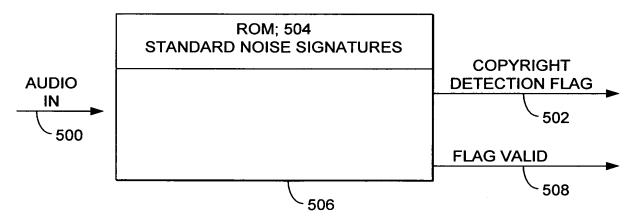
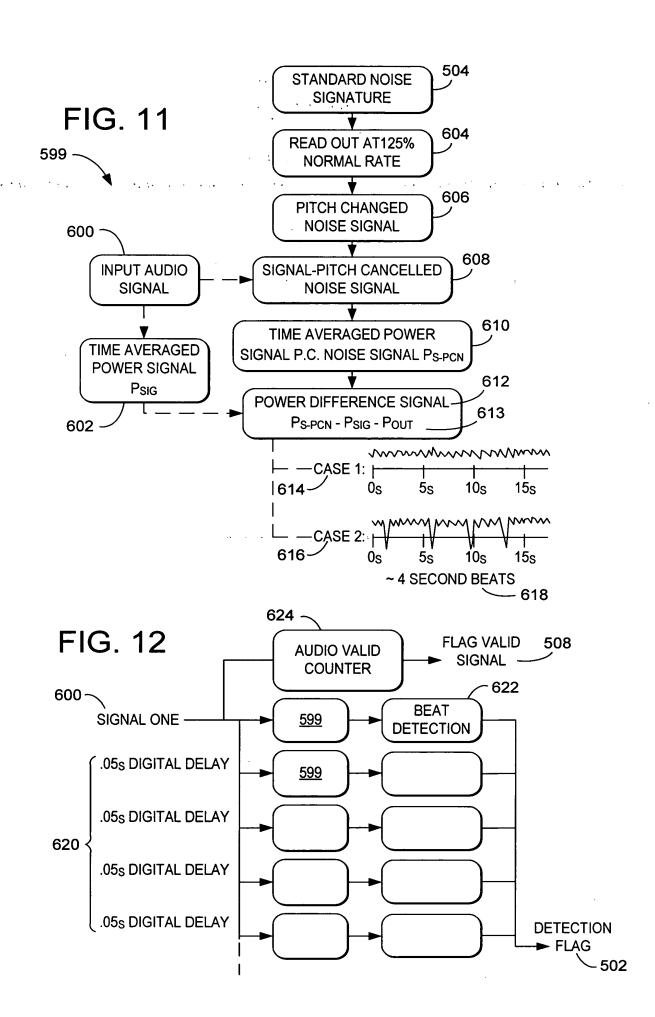
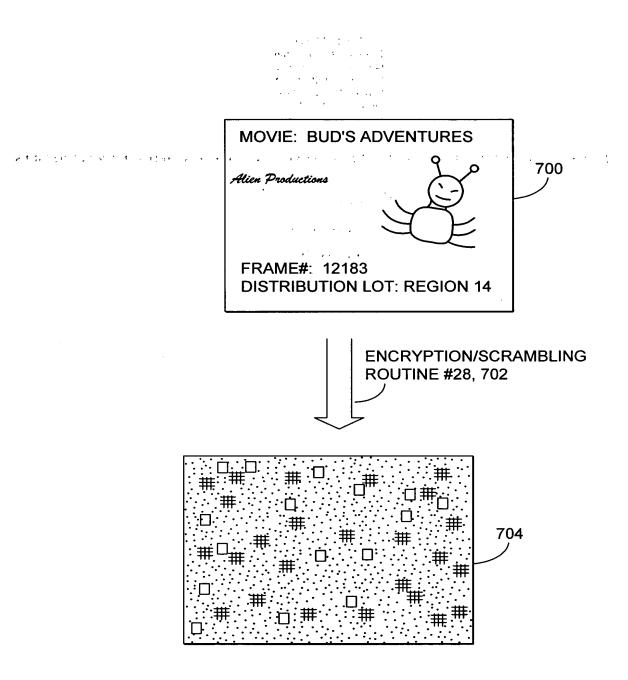


FIG. 10

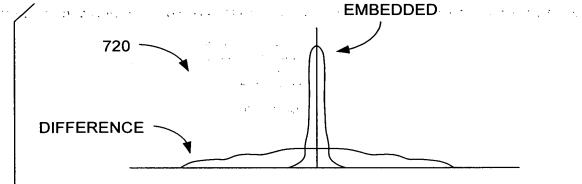




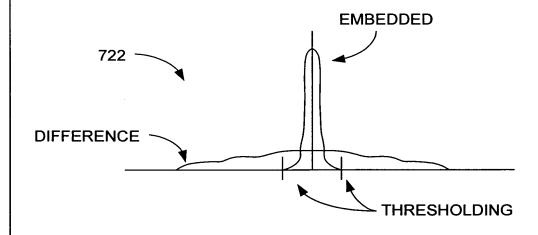


PSEUDO-RANDOM MASTER SNOWY IMAGE (SCALED DOWN AND ADDED TO FRAME 12183)

FIG. 13



MEAN-REMOVED HISTOGRAMS OF DIFFERENCE SIGNAL AND KNOWN EMBEDDED CODE SIGNAL



MEAN-REMOVED HISTOGRAMS OF FIRST DERIVATIVES (OR SCALER GRADIENTS IN CASE OF AN IMAGE)

FIG. 14

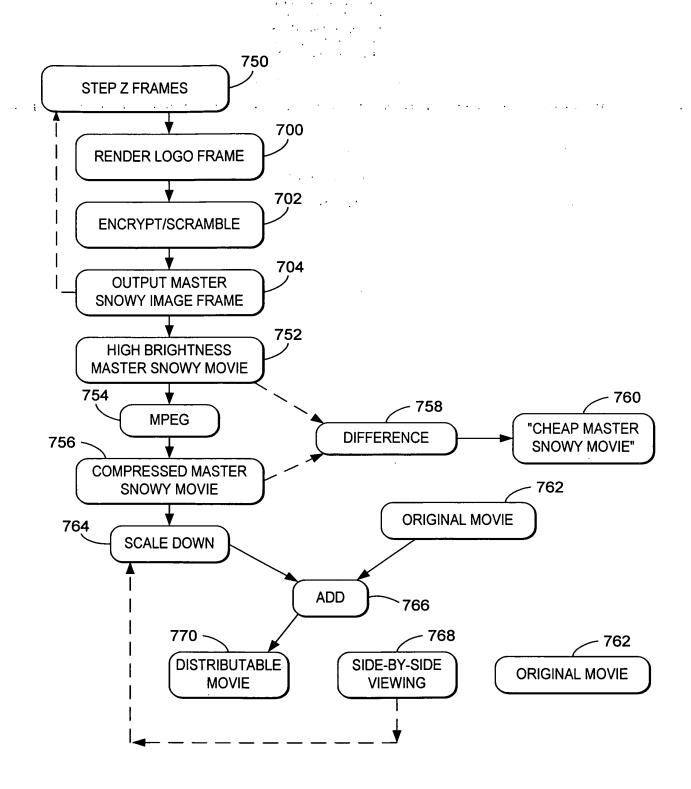
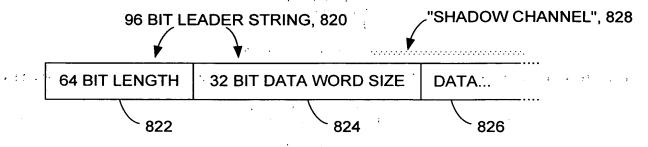


FIG. 15

FIG. 16



UNIVERSAL EMPIRICAL DATA FORMAT

FIG. 17

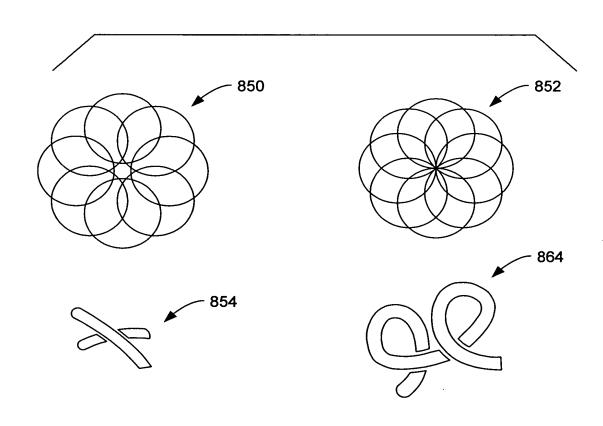
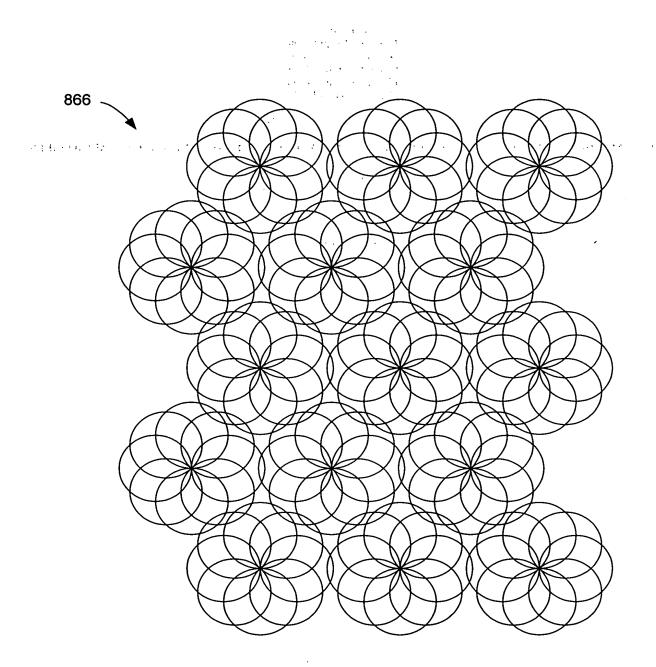


FIG. 18



QUEST FOR MOSAICED KNOT PATTERNS WHICH "COVER" AND ARE COEXTENSIVE WITH ORIGINAL IMAGE; ALL ELEMENTAL KNOT PATTERNS CAN CONVEY THE SAME INFORMATION, SUCH AS A SIGNATURE, OR EACH CAN CONVEY A NEW MESSAGE IN A STEGANOGAPHIC SENSE

FIG. 19

The second section of the section of the second section of the sectio

NOMINAL DISTANCE
TO CENTER OF

CENTER POINT
OF RING, 872

NOMINAL DISTANCE
TO CENTER OF

OUTER RING WIDTH, 870

2-D BRIGHTNESS OF PHASE-ONLY FILTERED RING IS SIMILAR TO THE ABOVE BRIGHTNESS PATTERN ROTATED ABOUT CENTRAL POINT OF RING:

OUTER RING WIDTH, 870

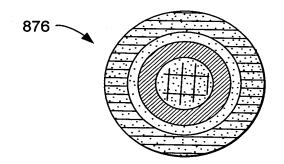


FIG. 20

900 C 2C C
2C 4C 2C
C 2C C

WHERE C = 1/16

ELEMENTARY BUMP (DEFINED GROUPING OF PIXELS WITH WEIGHT VALUES)

FIG. 21A

i										
	2	3	4		5		6	7	0	
	6	 7	 0		1		2	3	 4	<u>.</u>
				С	2C	С				
	2	3	4	2C	4C	2C	6	7	0	<u>.</u>
				С	2C	С				
	6	7	0		1		2	3	4	<u>.</u>
						, "				

EXAMPLE OF HOW MANY ELEMENTARY BUMPS, 900, WOULD BE ASSIGNED LOCATIONS IN AN IMAGE, AND THOSE LOCATIONS WOULD BE ASSOCIATED WITH A CORRESPONDING BIT PLANE IN THE N-BIT WORD, HERE TAKEN AS N=8 WITH INDEXES OF 0-7. ONE LOCATION, ASSOCIATED WITH BIT PLANE "5", HAS THE OVERLAY OF THE BUMP PROFILE DEPICTED.

FIG. 21B

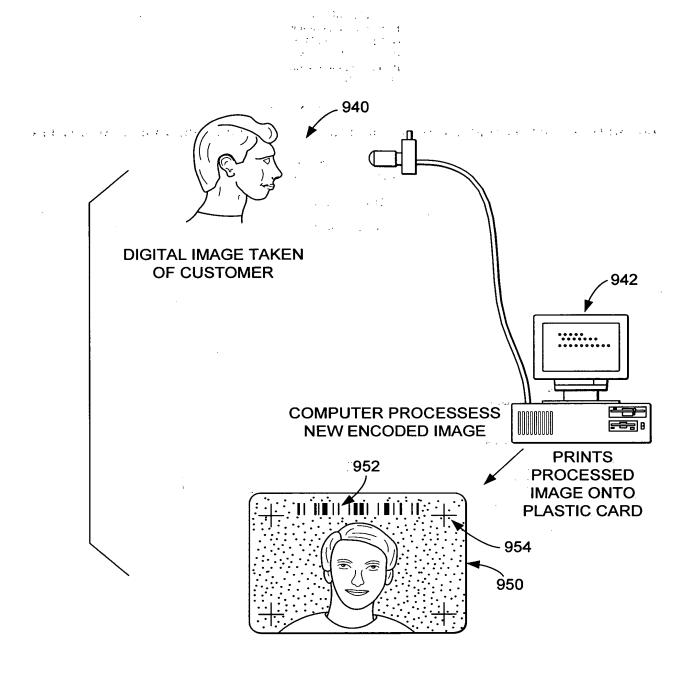
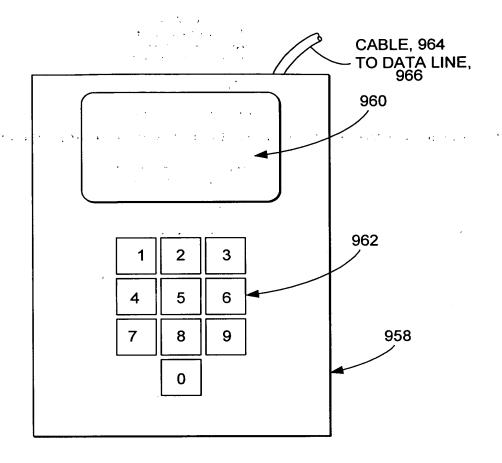


FIG. 22

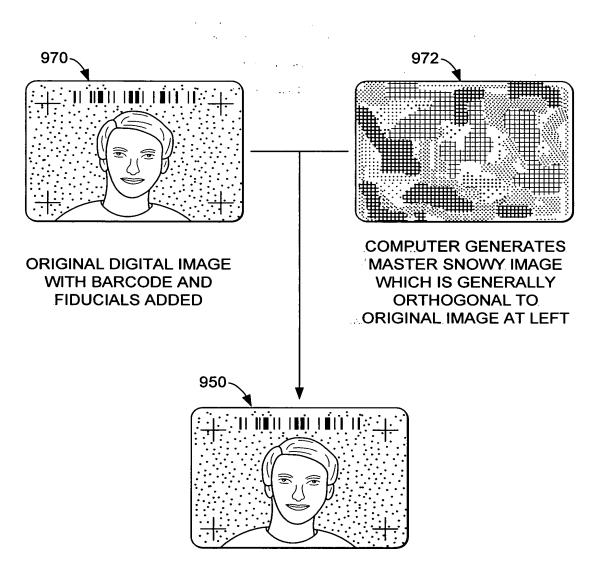


CONTAINS RUDIMENTARY OPTICAL SCANNER, MEMORY BUFFERS, COMMUNICATIONS DEVICES, AND MICROPROCESSOR

CONSUMER MERELY PLACES CARD INTO WINDOW AND CAN, AT THEIR PREARRANGED OPTION, EITHER TYPE IN A PERSONAL IDENTIFICATION NUMBER (PIN, FOR ADDED SECURITY) OR NOT. THE TRANSACTION IS APPROVED OR DISAPPROVED WITHIN SECONDS.

 $\label{eq:continuous} \mathcal{A}_{ij} = \mathcal{B}_{ij} \mathcal{A}_{ij}^{(i)} \qquad \qquad \mathcal{A}_{ij} = \mathcal{A}_{ij} \qquad \qquad \mathcal{A}_{ij} = \mathcal{$

化基斯基环 电电流 化双硫矿 电电路 化氯酚基氯化合物 医乳腺管 化二氯化物 化二氯甲基甲基磺胺 医电影 不建筑 化二氯酚基苯基二



COMBINED TO FORM PERSONAL CASH CARD

FIG. 24

TYPICAL TRANSACTION STEPS

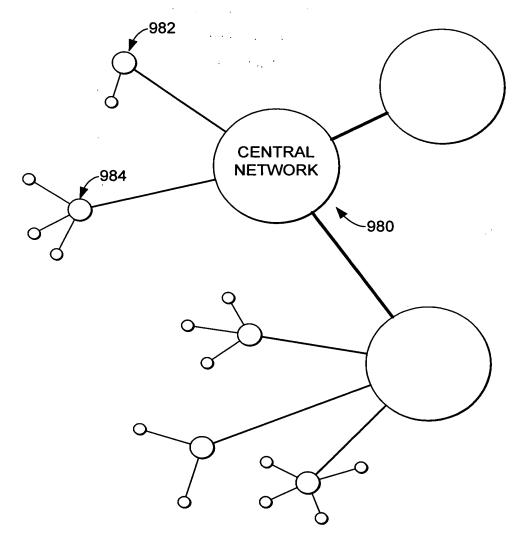
- READER SCANS IMAGE ON CARD, STORES IN MEMORY, EXTRACTS PERSON'S ID
 - **OPTIONAL: USER KEYS IN PIN NUMBER**
- READER CALLS CENTRAL ACCOUNT DATA NETWORK, HANDSHAKES
- READER SENDS ID, (PIN), MERCHANT INFORMATION, AND REQUESTED
 - **TRANSACTION AMOUNT TO CENTRAL NETWORK**
- CENTRAL NETWORK VERIFIES ID, PIN, MERCHANT INFO, AND ACCOUNT BALANCE
- RANDOM NUMBERS, WHERE THE RANDOM NUMBERS ARE INDEXES TO A SET OF IF OK, CENTRAL NETWORK GENERATES TWENTY-FOUR SETS OF SIXTEEN DISTINCI
 - 64K ORTHOGONAL SPATIAL PATTERNS
- CENTRAL NETWORK TRANSMITS FIRST OK, AND THE SETS OF RANDOM NUMBERS READER STEPS THROUGH THE TWENTY-FOUR SETS ထ
 - READER ADDS TOGETHER SET OF ORTHOGONAL PATTERNS

8B.

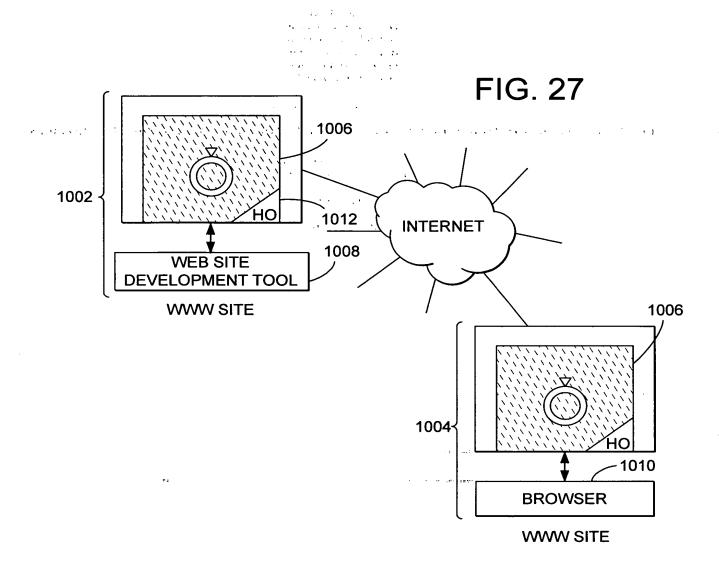
- READER TRANSMITS THE TWENTY-FOUR DOT PRODUCT RESULTS TO CENTRAL NETWORK READER PERFORMS DOT PRODUCT OF RESULTANT PATTERN AND CARD SCAN, STORES RESULT
- CENTRAL NETWORK CHECKS RESULTS AGAINST MASTER

 - CENTRAL NETWORK SENDS FINAL APPROVAL OR DENIAL
- CENTRAL NETWORK DEBITS MERCHANT ACCOUNT, CREDITS CARD ACCOUNT

THE NEGLIGIBLE-FRAUD CASH CARD SYSTEM



A BASIC FOUNDATION OF THE CASH CARD SYSTEM IS A 24-HOUR INFORMATION NETWORK, WHERE BOTH THE STATIONS WHICH CREATE THE PPHYSICAL CASH CARDS, 950, AND THE POINT-OF-SALES, 984, ARE ALL HOOKED UP TO THE SAME NETWORK CONTINUOUSLY



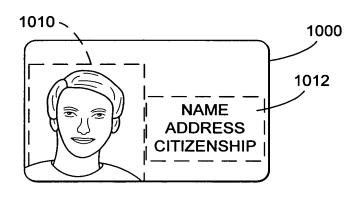


FIG. 28



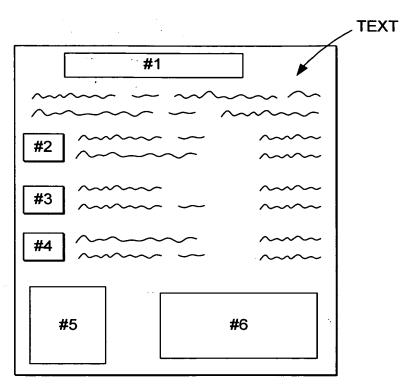


FIG. 27A

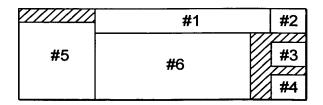
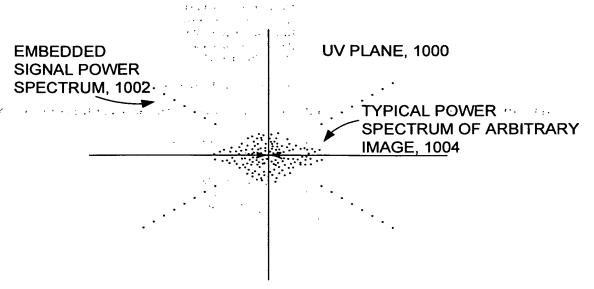
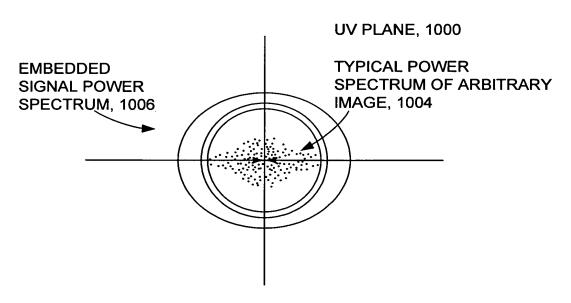


FIG. 27B



NON-HARMONIC SPATIAL FREQUENCIES ALONG THE 45 DEGREE AXES, GIVING RISE TO A WEAVE-LIKE CROSS-HATCHING PATTERN IN THE SPATIAL DOMAIN

FIG. 29



NON-HARMONIC CONCENTRIC CIRCLES IN UV PLANE, WHERE PHASE HOPS QUASI-RANDOMLY ALONG EACH CIRCLE, GIVING RISE TO PSEUDO RANDOM LOOKING PATTERNS IN THE SPATIAL DOMAIN

FIG. 30



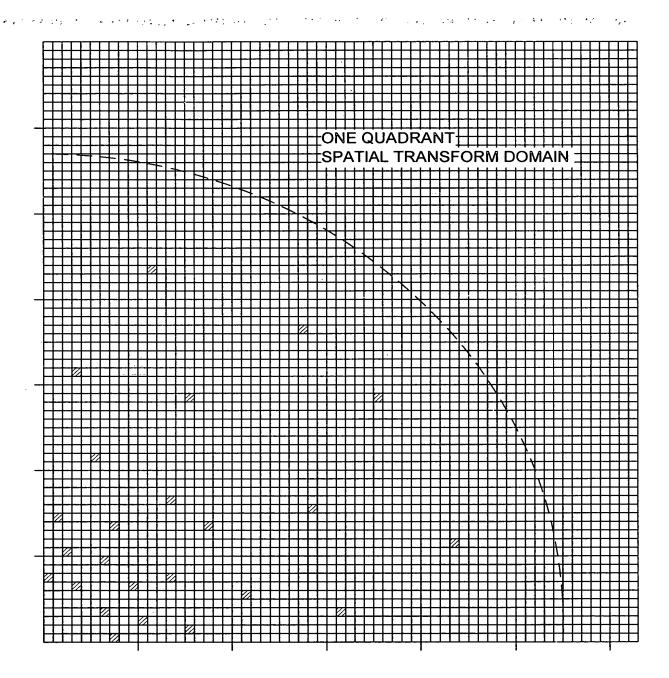
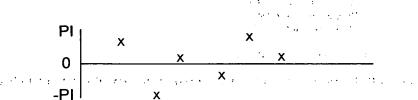
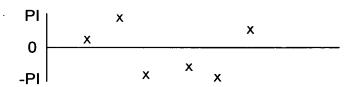


FIG. 29A



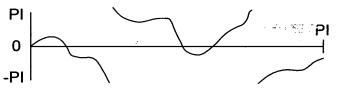
PHASE OF SPATIAL FREQUENCIES ALONG FORWARD 45 DEGREE AXES, 1008

FIG. 31A



PHASE OF SPATIAL FREQUENCIES ALONG BACKWARD 45 DEGREE AXES, 1010

FIG. 31B



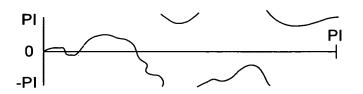
PHASE OF SPATIAL FREQUENCIES ALONG FIRST CONCENTRIC RING, 1012

FIG. 32A



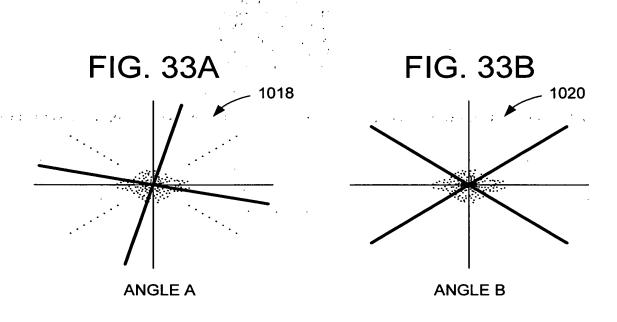
PHASE OF SPATIAL FREQUENCIES ALONG SECOND CONCENTRIC RING, 1014

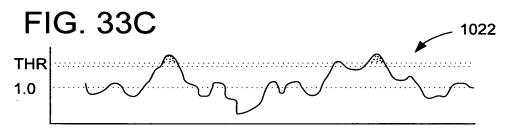
FIG. 32B



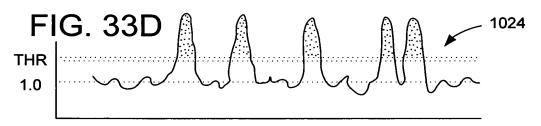
PHASE OF SPATIAL FREQUENCIES ALONG THIRD CONCENTRIC RING, 1016

FIG. 32C

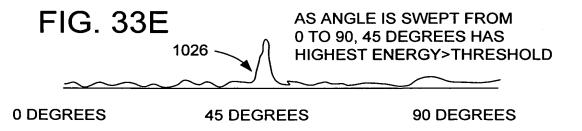


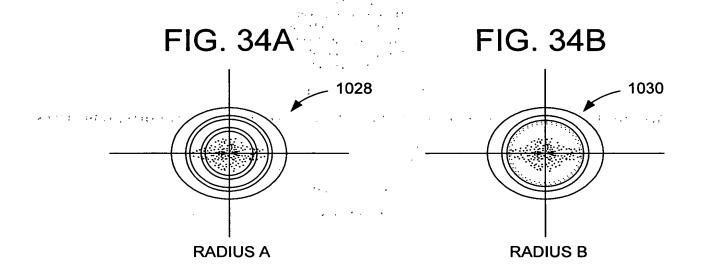


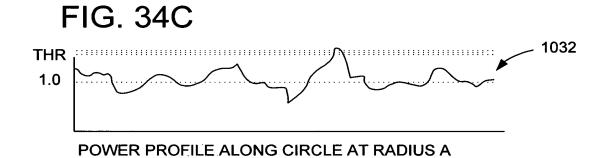
POWER PROFILE ALONG ANGLE A, AS NORMALIZED BY ITS OWN MOVING AVERAGE; ONLY A MINIMAL AMOUNT EXCEEDS THRESHOLD, GIVING A SMALL INTEGRATED VALUE



POWER PROFILE ALONG ANGLE B, AS NORMALIZED BY ITS OWN MOVING AVERAGE; THIS FINDS STRONG ENERGY ABOVE THE THRESHOLD







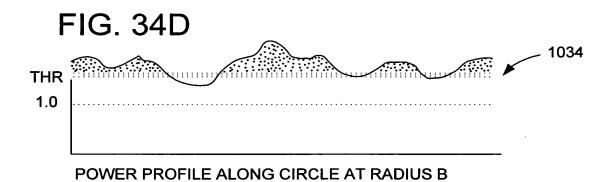


FIG. 34E

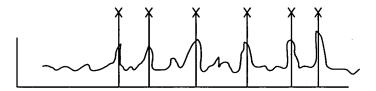
INTEGRATED 1038 1036

TOTAL INTEGRATED POWER ABOVE 1040
THRESHOLD AS FUNCTION OF RADIUS

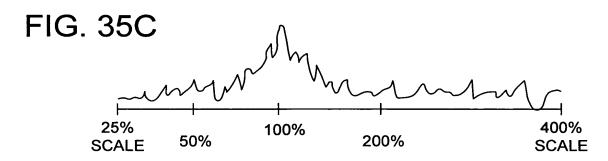


SCALE = A: ADD LL POWER VALUES AT THE "KNOWN" FREQUENCIES", 1042

FIG. 35B



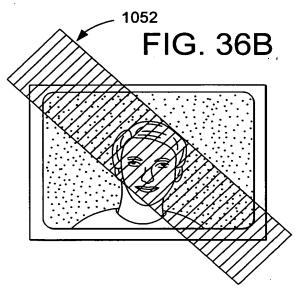
SCALE = B: ADD LL POWER VALUES AT THE "KNOWN" FREQUENCIES", 1044



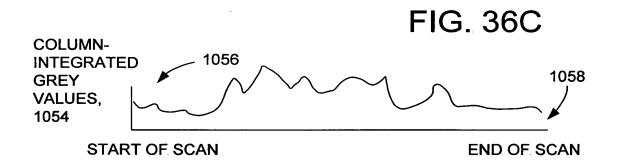
"SCALED-KERNEL" BASED MATCHED FILTER; PEAK IS WHERE THE SCALE OF THE SUBLIMINAL GRID WAS FOUND, 1046

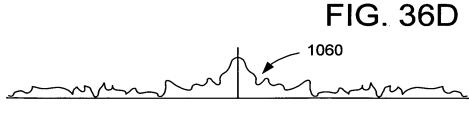
FIG. 36A

ARBITRARY ORIGINAL IMAGE
IN WHICH SUBLIMINAL GRATICULES
MAY HAVE BEEN PLACED



"COLUMN SCAN" IS APPLIED ALONG A GIVEN ANGLE THROUGH THE CENTER OF THE IMAGE





MAGNITUDE OF FOURIER TRANSFORM OF SCAN DATA

PROCESS STEPS

- 1. SCAN IN PHOTOGRAPH
- 2. 2D FFT
- 3. GENERATE 2D POWER SPECTRUM, FILTER WITH E.G. 3X3 BLURRING KERNEL
- 4, STEP ANGELS FROM 0 DEGREES THROUGH 90 (1/2 DEG)
- 5. GENERATE NORMALIZED VECTOR, WITH POWER VALUE AS NUMERATOR, AND MOVING AVERAGED POWER VALUE AS DENOMINATOR
- 6. INTEGRATE VALUES AS SOME THRESHOLD, GIVING A SINGLE INTEGRATED VALUE FOR THIS ANGLE
- 7. END STEP ON ANGLES
- 8. FIND TOP ONE OR TWO OR THREE "PEAKS" FROM THE ANGLES IN LOOP 4, THEN FOR EACH PEAK...
- 9. STEP SCALE FROM 25% TO 400%, STEP ~ 1.01
- 10. ADD THE NORMALIZED POWER VALUES CORRESPONDING TO THE 'N' SCALED FREQUENCIES OF STANDARD
- 11. KEEP TRACK OF HIGHEST VALUE IN LOOP
- 12. END LOOP 9 AND 8, DETERMINE HIGHEST VALUE
- 13. ROTATION AND SCALE NOW FOUND
- 14. PERFORM TRADITIONAL MATCHED FILTER TO FIND EXACT SPATIAL OFFSET
- 15. PERFORM ANY "FINE TUNNING" TO PRECISELY DETERMINE ROTATION, SCALE, OFFSET

FIG. 37